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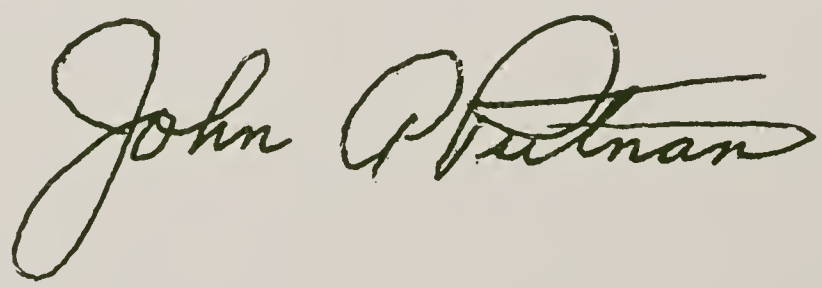
PRESIDENT'S MESSAGE

I was walking through the Arboretum recently, spending some time in the Japanese Garden. It was one of those warm, hazy Sunday afternoons. A good many family groups and individuals were enjoying the quiet beauty of the Arboretum. I wondered how many of them knew how much effort over the years had gone into the developing this place — the original planning and constant reorganization and maintenance. Yet anyone could appreciate the contribution that it is making to the cultural background of Seattle through its unique beauty, variety of plant life and peaceful atmosphere.

In this afternoon it was difficult to think about the budgetary crisis that has arisen concerning the Arboretum, as reported in the Summer *Bulletin* by Robert Behnke, Past President, and yet one had to think of it, for it could jeopardize the future of the Arboretum. Nevertheless, I can be reassured as I think of the work and devotion of the many individuals who make up the Foundation, such as Mrs. Neil Haig, former chairman of the Japanese Garden Committee, whose resignation I recently, and reluctantly, accepted; of the thoughtful realignment of priorities, activities, and staff by Brian Mulligan; of the financial support of both the Foundation and the Unit Council (some $5,000 contributed by the Unit Council this last month).

Now our opportunities for service are increased. We can do even more things to support the Arboretum — either collectively (as involved members of the Foundation and units), or independently in small groups, spending a few hours weeding.

I know that the Foundation will not stand by and allow this area of beauty and study — which depends so much on their creative efforts — to suffer too greatly at this particular time.



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THE UNIVERSITY OF WASHINGTON
Arboretum bulletin

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COVER PHOTO: *Umbellularia californica*
Photo by: *Whitie Marten*

JAN VAN HELMONT
Flemish physician and chemist
1577 - Dec. 30, 1644

Each In His Own Garden

*JULIA BELLE THOMPSON**

The historical development of the basic concepts of botany interests me greatly. To illustrate the nature of that development I have selected four men representing four centuries. Each in his own garden made a contribution to botanical science by the scientific method of observation and experimentation. Each presented definite proof of facts that earlier generations had only discussed theoretically.

Along with all earthlings I have felt in the last two or three years the emotional impact of the astronauts as they flew around the moon. They have photographed the dead, grey, lifeless moon for us and shown on our television screens the Earth clothed in its blue atmosphere. They have read for us the old, old story of creation.

I have recently been moved to reread that chapter from Genesis. I felt glad that it was not until after the third and fourth days when the Earth had "brought forth grass, the herb yielding seed, the fruit tree yielding fruit after his kind" and the "sun placed in the sky" that the "living creatures" and "man in His own image" were created. For as we know now through the patient work of men of science, animals and man himself can not exist without the miracle of the green chlorophyll of plants and its synthesis by light, water, and the carbon dioxide in the air. Without plants the earth would be without life, as dead and uninviting as the moon.

I also reread an article in the November 1953 issue of the *Scientific American* on "The Progress of Photosynthesis". The writer, Eugene I. Rabinowitch, says in his first sentence that this remains one of the "great unsolved problems of biology." Successive pages tell us of the extensive study which has been and is being made, of what makes our world green. Since 1953 there has been, we know, considerable breakthrough on this subject.

We might also read of Priestley who discovered oxygen and others who, step by step,

*This is the first in a series of articles written by Julia Belle Thompson (Mrs. William F.), one of the founding members of Unit 15, the Sylvia Henry Unit.

built up our present knowledge of photosynthesis.

A particularly exciting story, however, is the "pre-step" (we might call it) taken by the man who must come first in point of time on our list of four "Do It Yourselfers". Dr. Jan Baptista van Helmont (1577-1644) was an M.D. of Flanders, as well as an alchemist and philosopher. He performed the now famous willow tree experiment to disprove Aristotle's premise that plants are fed by their roots alone.

Second, on our list, is another Doctor of Medicine, a graduate of the University of Tubingen Medical School, a life-long Professor of Medicine there and Curator of the Botanical gardens: Dr. Rudolf Jacob Camerarius (1665-1721) who published a report called "Sex in Plants" through the medium of letters to fellow scientists in the year 1694.

A third group of studies, this one published in book form in Berlin, was done by Christian Conrad Sprengel (1750-1816) whose absorbing interest was in the cross-pollination of flowers by insects.

The fourth experiment, reported to the members of his scientific society in 1865, was done by Gregor Mendel (1822-1894) on "heredity" in plants. It resulted in what everyone knows now as the Mendelian laws.

"In the thought of each age is the foundation for that which follows." So said Sir William Thiselton-Dyer, (1843-1928) director of the botanical gardens at Kew and founder in 1887 of *the Kew Bulletin*. Sir William expresses well the theme of this story of four botanists, three of whom were basically curious about man himself. The interest of Sprengel was primarily in the flowers. All four had a practical ability to observe plants, to question, and to frame workable experiments with such exactness as to satisfy curiosity. Living and working in different centuries, in places which were far apart at that time, each of them made such a contribution to botanical understanding that no comprehensive history of biology can be written today without mentioning their names and the details of their work.

The four men had much in common. Except for van Helmont, they were all Germans, and teachers. Van Helmont, a Belgian scientist, and Camerarius, were both Doctors of Medicine and men of wealth. All four were interested in natural history. They all had a feeling of kinship with plants as living organisms. Three of them showed a special insight into the work of the flower as the reproductive part of the plant. Van Helmont was more interested in plant nutrition.

Finally and sadly — one might say tragically for Sprengel and Mendel — no one of them lived to reap the rich recognition which came to them posthumously. A simple chart will show you this fact:

	Born	Died	Published	Won Recognition	How Long
VAN HELMONT 16th Century	1577	1644	Probably early 17th century	20th Century	300 yrs. after birth? 243 yrs. after death?
CAMERARIUS 17th Century	1665	1721	1694	1735	14 yrs. after death 41 yrs. after publishing
SPRENGEL 18th Century	1750	1816	1793	1850	34 yrs. after death 57 yrs. after publishing
MENDEL 19th Century	1822	1884	1865	1900	16 yrs. after death 35 yrs. after publishing

Jean Baptista van Helmont

In the early pages of his *History of Biology* (1936), a most useful book for source material, Nordenskiold says that van Helmont was a precocious child who finished his university course at seventeen. He travelled for several years in different countries. "He then contracted a wealthy marriage and settled down on an estate in his home district, dividing his time between scientific research and splendid acts of benevolence." He carried on his practice of medicine but only for charity, consistently refusing all fees and all offers of work that would bring him money.

Stories told about other alchemists of that early day are also told of van Helmont. He was one of those who believed he had turned quicksilver into gold. He was so filled with delight at this accomplishment that he named his new born son *Mercurius*. He believed also that he had produced rats in a vessel containing rags and bran. Such beliefs along with his *inspirations* and *ecstasies* and *visions* suggest that he might have experimented somewhat with drugs. However van Helmont had calm moments when he pondered the concepts of Aristotle. He at times opposed them vigorously and successfully. It was in this spirit that, doubting Aristotle's theory that plants get their food through their roots directly from the soil, he determined to plant a willow twig in order to test this matter thoroughly. Nordenskiold describes the experiment thus:

"Van Helmont placed 200 pounds of soil, previously dried in an oven, in an earthenware container. He planted in the soil a willow shoot weighing five pounds. For the next five years the experimenter watered the plant regularly with rain water and the willow grew normally. At the end of that time he weighed the tree and found that it totalled 164 pounds. He dried the soil again and weighed it. Its weight was the 200 pounds less only 2 ounces. Wherever the plant material came from, it certainly had not all come from the soil, and van Helmont concluded that the 164 pounds of bark, wood, roots and leaves, had been derived from rain water." Says *Botany*, the textbook we have mentioned before, "His conclusions were wrong, in part because of inaccuracies in drying and weighing his soil, but primarily because the elementary concepts of chemistry were unknown at the time. His experiment, however, was far ahead of the period in the application of the scientific method. During the next three centuries, important contributions helped to piece together the story of how plants manufacture food by photosynthesis."

Nordenskiold's reaction is "This experiment, which indeed was perfectly correct in both plan and execution, altho the conclusion he drew from it was wrong, testifies that nevertheless van Helmont was a true pioneer in the field of natural science; to have thought out the first biological experiment based on qualitative calculations, is a service to science which well compensates for many mistakes in the theoretical sphere."

We read in F. C. Steward's *About Plants*, printed in 1966; "Primitive ideas of plant nutrition are as old as agriculture. The emphasis was on the soil as the source of the stuff of which plants are made. From Aristotle in the third century B.C. to van Helmont in the late sixteenth and early seventeenth centuries A.D., this view remained virtually unchanged. Probably prompted by a much earlier and even more obscure writer, Nicholas de Cusa (1401-1464), van Helmont performed his now celebrated experiment with the willow twig." Steward follows this by a condensed story of the experiment saying that van Helmont drew the conclusion that the 160 pounds of willow tree could not have come from the soil which had lost only two ounces, but that the extra weight the tree had acquired had come from the rain water. "Nevertheless," Dr. Steward says: "We may well credit van Helmont with the first information 'that a minute amount of organic material is absorbed by the roots from the soil.' "

Eugene I. Rabinowitch, a distinguished physicist and biochemist, published in 1957 a reprint along with other botanical articles from the *Scientific American* in a paperback called *Plant Life*. The aforesaid article was titled "Progress in Photosynthesis". Its first sentence reads:

"Photosynthesis — the synthesis of organic compounds from carbon dioxide and water by plants in light — remains one of the great unsolved problems of biology. If investigators of this process have made any progress in recent years it may be summed up in the conclusion that photosynthesis is much more complex than used to be thought." Successive pages tell us of the extensive study that has been made of what makes our world green. His latest writing that we have just received is *Photosynthesis,* E. Rabinowitch and Govindjee (1969). On p. vi of the preface, is this sentence "Photosynthesis is one of the most fascinating achievements of biological evolution on earth." Also "Evolutionary development of photosynthesis has been a remarkable case of life 'lifting itself by the bootstraps,' because photosynthesis as we now know it, requires complex organic pigments — such as the green pigment, chlorophyll."

He says also "the striking nature of the evolutionary achievement involved is shown by our incapacity to repeat this process with the same efficiency outside the living cell, despite the many sophisticated techniques now at our disposal."

Dr. Rabinowitch as we turn to page one, states that "Literally, photosynthesis means synthesis with the help of light." He then retells the familiar story of how, near the turn of the 17th century, "a Dutchman, *van Helmont*, grew a willow tree in a bucket of soil and found that the amount of soil did not diminish significantly, although a big tree was formed. He guessed that the material of the tree must have come from *water* used to wet the soil." (In later pages we find justification for van Helmont's theory of the help of water in this growth of the plant.)

In 1727, *Stephen Hales,* (also in contrast to Aristotle's views) "surmised that plants drew a part of their nutrition from the air", and that *sunlight* may play a role in "ennobling the principles of vegetables."

"Hales' and van Helmont's insights were remarkable. But before the advent of modern chemistry, they had to remain guesses, not provable by reliable experiment or by reference to well-established general laws."

Van Helmont's experiment is credited with setting in motion the thinking that led to the concept of photosynthesis. The research and results have engaged the interest of scientists as the two centuries have plodded steadily along. That interest has been quickened for us all recently by man's visits to the dead moon, which has light in plenty, but no water and no atmosphere. The Earth has atmosphere with carbon dioxide; it also has water. And it has sunlight to synthesize the water and carbon dioxide.

In the winter *Bulletin* of 1971 of the University of Washington Arboretum, Dr. Peter K. Nelson has fortunately for the readers of the *Bulletin*, presented a clear statement of the very modern theory of photosynthesis. He gives a remarkable definition of what constitutes a *living* thing! "One of the most obvious of the many characteristics that distinguish living organisms from non-living, is that living ones *do* things — they carry on many functions and activities and these require that energy be expended."

In summing up his article, Dr. Nelson says, "Of necessity we can take only a broad, and to some extent superficial view, since to examine photosynthesis in all its details, even incompletely known as they are at present, would involve us in physical and chemical discussions too lengthy and complex to go into here." He goes on to say "after several hundred years, during which almost no progress was made in our understanding of photosynthesis, at the present time that knowledge is advancing at such a rate it is difficult to keep pace with it."

(To be continued next issue.)

The Maples, their Variety and Versatility*

BRIAN O. MULLIGAN

In 1958 the American Association of Botanic Gardens and Arborita published a listing of the different kinds of maples being grown in twenty-four of the leading arboreta and botanical gardens in the United States and Canada. The area covered extended from Montreal, Canada to St. Louis, Missouri, and from Los Angeles, California to Vancouver, British Columbia. This compilation can serve as a basis for information about species, varieties and garden forms of maples. The total number then recorded included 68 species, 37 subspecies or varieties, 160 forms or cultivars, and 7 hybrids — in all 272 different kinds. Since that date at least four more species have been introduced as well as a number of new cultivars.

Botany

The species of *Acer* have been arranged by several authors (Pax, 1902; Rehder, 1949; Murray 1969-70) into a number of groups or series containing those species closely related by their botanical characteristics, especially those of the inflorescences and to a lesser degree the leaf buds and foliage. Some of these series are quite large, such as *Macrantha*, which includes many of the Chinese and Japanese species as well as one N. American, the moosewood *(A. pensylvanicum)*, and *Spicata*, including the European sycamore maple, the well known *Acer Ginnala* from E. Asia and our western bigleaf or Oregon maple. Others are very small, and some are so distinct that they are placed alone; e.g. *A. carpinifolium* from Japan, *A. glabrum* from the western U.S.A. The red and silver maples are associated in series *Rubra*, both flowering in early spring before the leaves appear.

More details as to these groups can be found in Rehder's *Manual of Cultivated Trees and Shrubs*, 2nd edition, published by Macmillan (1940), as well as in *Maples Cultivated in the United States and Canada*, published by the American Association of Botanic Gardens and Arboreta in 1958.

A few hybrids exist, some natural, chiefly from Europe, some artificial, mostly raised in this country, but up to the present little has been done systematically to produce them for horticultural purposes. There is a large and interesting field open here.

Distribution and Hardiness

Maples (genus *Acer*) are an old and well distributed group of woody plants. At the present time the largest number of species are found in China (about 58), in N. America as far south as Guatemala (25, Japan (22), Europe (11 or 12), Taiwan (9), S.E. Asia (9), India, Burma and Tibet (7), W. Asia and N.E. Asia, (7 each), total approximately 155 species, of which 112 or 72% are found in Asia from India eastwards. They extend there as far north as Manchuria and Siberia, south to the tropics in Java, Sumatra and the Philippine Islands; in N. America from Alaska and Hudson's Bay to Guatemala and Florida. The most widespread species in Europe are the field or hedge maple (*Acer campestre*) which grows as far north as S. Sweden, and the Norway maple (*Acer platanoides*), distributed from Turkey and Greece to N. Russia, Finland and Norway.

From this great range it is obviously possible to select species which should be adaptable to all kinds of climates, from tropical to northern continental. Most of you today will be interested in the hardier species. In this connection I obtained lists of maples cultivated at the Morton Arboretum at Lisle, Illinois, and on the campus of Michigan State University at East Lansing, through the courtesy respectively of Mr. Walter Eickhorst, Curator of the Collections at Morton Arboretum, and Prof. C. E. Lewis, Prof. of Horticulture at Michigan State University. Both of these institutions are located in the same climatic zone (IV), based on the average annual minimum temperatures,

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*A lecture given at the 9th annual Clara B. Ford Garden Forum at Dearborn, Mich. on April 23, 1970.

whereas Detroit and the area surrounding Lake Erie are considered to be slightly warmer and are placed in Zone V. Any species therefore which can be grown at either of those two places should also be cultivated in regions south or southeast of them, though perhaps not all in the plains states to the southwest such as Iowa, Kansas and Nebraska.

At the former institution, which is not noted for an equable climate, they are growing about 35 different species and more than 100 other varieties or cultivars, including 18 forms of Norway maple. Amongst the species are *A. palmatum, A. japonicum, A. nikoense, A. carpinifolium* and *A. Buergerianum* from Japan; *A. griseum* and *A. truncatum* from China; *A. cappadocieum* from W. Asia; *A. leucoderme* from the southeastern U.S. and the vine maple of the Pacific states, *A. circinatum.*

Most of these are also grown at East Lansing, with *A. crataegifolium* from Japan, a charming small tree flowering early in the season. In addition Prof. Lewis includes, with some reservations, two more species from China, *(A. Grosseri* and *A. Davidii)*, and two from Japan *(A. capillipes* and *A. rufinervee)* all of which are quite closely related and form very ornamental small trees.

There is therefore both reason and scope for increasing the variety of maples planted in this region. It is probably more a question of obtaining plants, since many of those mentioned are only grown by a small number of specialist or venturesome nurseries. They are, however, well worth seeking out and providing suitable sites for them in gardens, especially those where some native trees or other shelter already exists.

Propagation

A full account of the several available methods is given in *Maples Cultivated in the United States and Canada,* in a chapter written by Roger G. Coggeshall, formerly propagator at the Arnold Arboretum, Boston. For the amateur, the easiest method is to collect seeds when ripe and, depending upon where you live and your winter conditions, either sow them at once and leave them in a cold frame, protected from mice, for germination in spring; or else keep the seeds through the winter in the refrigerator, but not frozen, then sow them in the spring as soon as outdoor conditions permit. Sometimes only a few seedlings will germinate in the first spring, but by holding the containers for another year better results may be obtained. Some species such as paperbark maple (*Acer griseum*) form only a small percentage of viable seeds (5–20%), while in others it is usually high (*A. Davidii* and *A. rufinerve*.) The proximity of other trees of the same or related species certainly helps in seed production, although hybrids may appear in such cases.

Propagation by softwood cuttings in summer is possible only under a mist system or under plastic sheet, requiring proper equipment and care in both methods. Some species will root relatively easily (*A. carpinifolium, A. cissifolium*) while others are difficult or even

Stems and branches of hybrid maple similar to *A. Grosseri var. Hersii* by Arboretum Drive E., planted Nov. 1962. Photo by: B.O. Mulligan

impossible, especially those in section *Trifoliata (A. griseum, A. nikoense).* A further difficulty arises in bringing the rooted cuttings through their first winter; they must be potted and gradually weaned from the mist or plastic conditions until they can be planted outside in cold frames, then adequately protected for the winter. A dormant period under cold conditions is essential.

Maples are also propagated commercially by budding or grafting, the former outdoors in summer, the latter under greenhouse conditions in spring or sometimes in August (*A. palmatum*). In each case suitable stocks have to be available in advance. Again, some species are not amenable to propagation by grafting, except on one of their own kind (*A. griseum*). Individual plants of special form or merit have to be propagated by one of these two methods; for example, all the named forms of the Norway maple, and usually the clones (or cultivars) of the Japanese maple, *Acer palmatum.*

Copies of *Maples Cultivated in the United States and Canada* may be obtained, price $1.00 each, from the Secretary of the A.A.B.G.A., Dr. Fred B. Widmoyer, Dept. of Horticulture, New Mexico State University, Las Cruces, N.M. 88001. It contains a bibliography of 21 items concerning this most varied, widespread and horticulturally valuable genus of trees and shrubs.*

Maples for Special Purposes

(a) *Large shade trees* (arranged in order of hardiness)	
*Sugar maple *(Acer saccharum)*	Zone III
Black maple *(A. nigrum)*	"
*Norway maple *(A. platanoides)*	"
*Red maple *(A. rubrum)*	"
Silver maple *(A. saccharinum)*	"
**Acer Mono*	Zone V
Sycamore maple *(A. Pseudoplatanus)*	"
*Oregon maple *(A. macrophyllum)*	Zone VI
(b) *Smaller trees* (generally 20-45 feet tall)	
Box elder *(Acer Negundo)*	Zone II
Mountain maple *(A. spicatum)*	"
*Moosewood *(A. pensylvanicum)*	Zone III
Hedge maple *(A. campestre)*	Zone IV
**Acer tegmentosum*	
Hornbeam maple *(A. carpinifolium)*	Zone V
*Vine maple *(A. circinatum)*	"
David's maple *(A. Davidii)*	"
Rocky Mtns. maple *(A. glabrum)*	"
*Paperbark maple *(A. griseum)*	"
Acer Grosseri var. *Hersii*	"
Montpelier maple *(A. monspessulanum)*	"
*Nikko maple *(A. nikoense)*	"
**Acer refinerve*	"
Acer truncatum	"
(c) *Shrubby maples*	
**Acer Ginnala*	Zone II
Tatarian maple *(A. tataricum)*	Zone IV
*Japanese maple *(A. palmatum)*	Zone V
(d) *Maples with attractive bark*	
Acer capillipes	
Acer Davidii	
Acer griseum	
Acer Grosseri and var. *Hersii*	
Acer pensylvanicum	
Acer rufinerve	
Acer tegmentosum	

*Copies of this fine publication by Mr. Mulligan are available at the Arboretum office.

←

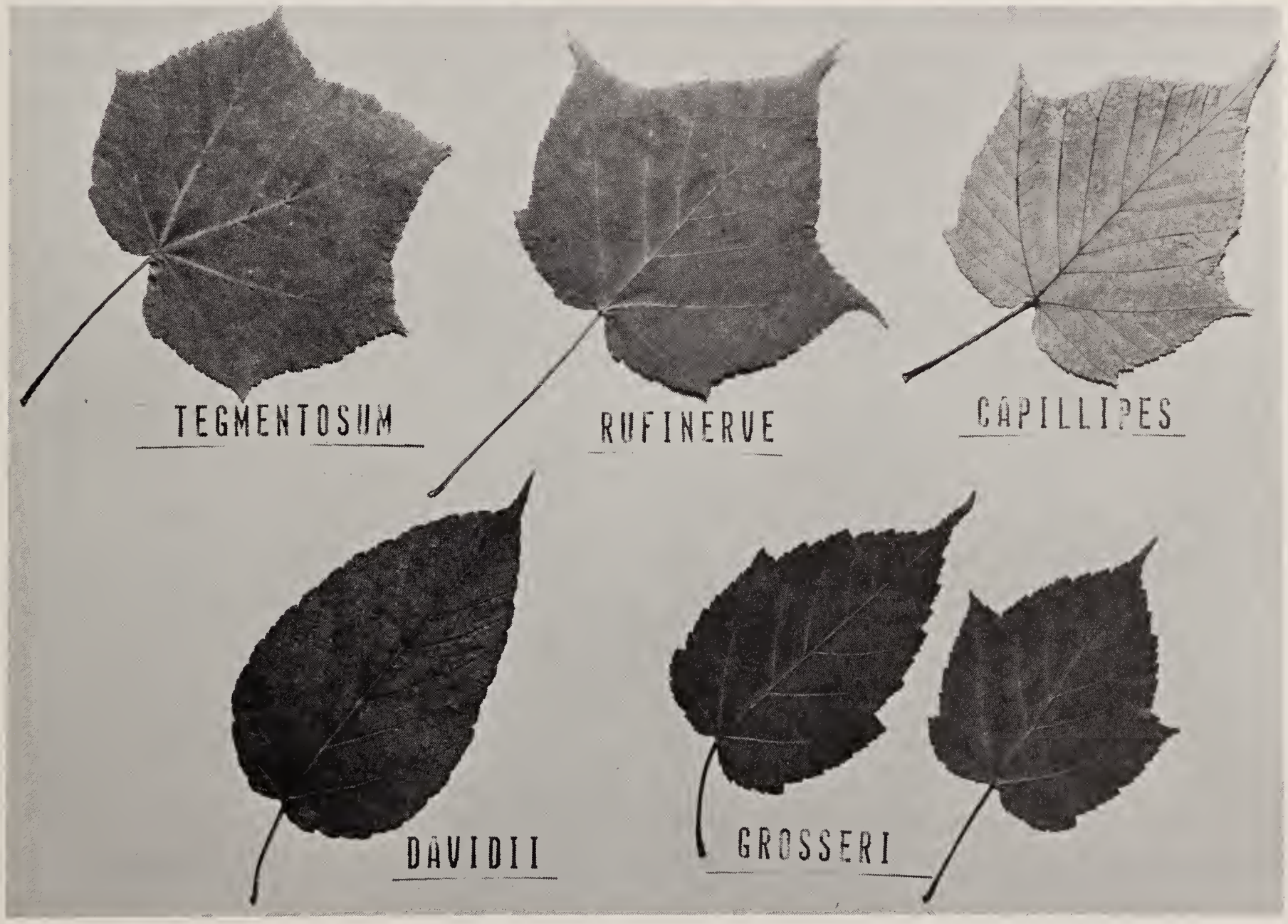
Paperbark maple, *A. griseum,* 45 years old, 12 ins. d.b.h., at Mount Usher, Co. Wicklow, Ireland. Photo by: B.O. Mulligan.

A. capillipes — **flowering branch from female tree west of Winter Garden.** Photo by: Whitie Marten

→

A. crataegifolium **from N. of Woodland Garden, male flowers.**
Photo by: Don Normark

Dried specimens of leaves from University of Washington Arboretum. Photo by: Whitie Marten



ARBORETUM REPORT

JULY 1970 – JUNE 1971
BRIAN O. MULLIGAN

1. *Principal improvements, additions or alterations*

Spraying, pruning and fertilizing of the Japanese cherries (*Prunus subhirtella* forms) along Azalea Way has been continued, to try to counteract the effects of bacterial blight and die-back disease. This is proving helpful but needs to be continued. At the end of September a number of the large trees on the Boulevard near Madison St. and along Arboretum Drive were pruned with the aid of the Hi-Ranger borrowed from the University. A large drain 540 feet long was constructed in October in the small valley west of Azalea Way between Woodland Garden and Loderi Valley, to carry off excess water; this required 95 cubic yards of washed gravel to fill it.

All grass areas on the lighter soils along Arboretum Drive East, around the lagoon and on Foster's Island were fertilized in October, and two tons of ground limestone spread on heavier soil areas and in the lilac section west of the Boulevard. In the fall, new sprinkler systems were installed in the latter area and in the oak section at the north end of the Arboretum, funded by the O.D. Fisher Foundation.

The fence on the west side of the nursery was rebuilt in July and August, replacing 60 cedar posts and using almost 6,000 feet of barbed wire. That on the east side has been reinforced temporarily with used railroad ties, with excellent cooperation from the grounds staff of Broadmoor golf course.

During the winter we removed two large old maple trees along Arboretum Drive suffering from serious decay, and three in the Japanese Garden. In the Pinetum unwanted native trees and bushes were removed, dead lower branches pruned off the pines and the whole area generally tidied up. The same process was carried out to a lesser degree around the parking lot north of the East Lynn Street footbridge, giving space for some improvements in the existing plantings. In Woodland Garden the twenty year old planting of viburnums was drastically pruned and thinned, again making some room for new spring plantings.

The usual dormant season sprayings of the Japanese cherries for bacterial blight and of crab apples, hawthorns, lindens and other aphis-bearing trees were carried out. A variety of new directional and warning signs were set out, the former of wood with routed letters, the latter painted on metal with reflective lettering. The severe windstorm on March 26 blew down ten trees in the Arboretum, the largest a Douglas fir outside the Broadmoor gate which fell against a tall cottonwood tree and caused us more trouble than usual to remove.

Japanese Garden Improvements

The machiai was constructed to the north of the tea house during July 1970 by Ishimitsu and Sons. The washbasin of wood with a copper bowl was designed and constructed by the University of Washington Physical Plant staff.

The bed of Japanese iris on the west side of the pond was replanted in September using twelve kinds received from the Botanical Garden, University of British Columbia, which had originally obtained them from Tokyo. In late April and early May R. Yamasaki and his crew again pruned the evergreen trees, a number being trained and tied to bamboo canes.

Stepping stones were laid from the machiai to the tea house in May and drains at ground level to catch water from the roof. Planting around the machiai was then completed, filling in the box hedge and adding more plants of *Nandina* and a few azaleas.

Because of the abnormally wet weather in March a new drain had to be constructed near the south end of the garden down one of the paths, and several others cleared and refilled with gravel. Percolation of water from the hillside to the west through the cherry orchard also became a problem, but this has now been relieved at its source by the City Engineering Department diverting a small stream back onto its original channel.

2. *New Plantings*

In November nine more peonies were planted in the collection on the west side of Arboretum Drive, north of Rhododendron Glen. On the lagoon bank more willows and two groups of cotoneasters, and on Foster's Island six more birches were set out. In Woodland Garden, nine new Japanese maples and three *Hamamelis*, including two new hybrids from the Arboretum at Kalmthout, Belgium.

A number of hybrid mountain ashes were transferred to the University of Washington campus and replaced by others of known origin. Six more dwarf conifers were added to the collection near the north end of Azalea Way, and additional *Rosa* species or hybrids to the bed at the entrance to Foster's Island.

Around the parking lot below the East Lynn Street bridge we added several groups of *Callicarpa* species for their fall color and fruits, more *Forsythia* species and hybrids for spring effect, hydrangeas for summer, and trees of Kentucky coffee and *Aralia* for their striking foliage. More evergreen trees were placed on the bank above them for screening purposes, with several plants of *Amelanchier*, the service berry, and *Halesia*, the silverbell tree, for their spring flower display.

Along the Boulevard just north of Boyer Avenue a new grouping of four *Syringa* species was made in mid March, accompanies by a pair of red maples for fall color and three young redwood trees.

A new bed of assorted shrubs was planted beside Arboretum Drive at the top of Rhododendron Glen in mid April. This included two species of *Osmanthus, Berberis linearifolia* from southern Chile, and several forms of *Potentilla fruticosa*, so should provide interest at different seasons.

Several different forms of *Ilex cornuta* were placed in the Japanese Garden, as well as a group of the azalea 'Caroline Gable' on the northwest side of the lake and a Japanese alder (*A. Fauriei*) beside the moon-viewing platform.

Finally, in May we filled in gaps in the *Cistus* collection with rooted cuttings or young seedlings, planted the beds outside the offices and restrooms with a variety of mostly tender plants for summer interest and effect, and completed planting around the machiai in the Japanese Garden.

Altogether this season we set out 617 plants of all kinds; of these 99 were deciduous trees, 47 evergreen trees (almost all conifers) and the balance of 471, shrubs of many kinds. In 1969-70 the total number was 658.

3. *Acquisitions*

(a) *Plant material*

During the past year 688 items have been received, entered in our acquisition book and acknowledged to the many donors. This compares with 580 in 1969-70, and 743 in the

Lights in the Arboretum — the old and the new. Photo by: Mrs. Carl F. Gould, Jr.

previous year. Of this total 333, or 48%, were seeds; they came from some 45 horticultural and botanical institutions in 19 countries throughout the world. Some of the larger collections were: 27 packets gathered in Mexico by E. Narro of the Arboretum staff, 16 *Rhododendron* species or hybrids from the American Rhododendron Society, and 64 kinds of trees and shrubs acquired on my tour in the British Isles in October and early November, following the Royal Horticultural Society's Conifer Conference in London and Edinburgh.

Amongst the 355 items of living plant material received were *Hibiscus* and oleanders from Texas, new viburnums from the U.S. National Arboretum, a new *Clematis* species from Nepal through the Royal Horticultural Society in England, collections of Japanese *Hosta* species (21 kinds) from the Arnold Arboretum, Boston, Mass., of Japanese iris (12 kinds) from the Botanical Garden at the University of British Columbia, Vancouver, B.C., 23 dwarf confiers purchased from or donated by the Don Smith Nursery in New Jersey, six more peony hybrids purchased from a nursery in New York, scions of crab apples from the Arnold Arboretum and the University of Minnesota Arboretum, various seedling trees and shrubs from the U.S.D.A. Plant Introduction Station, Glenn Dale, Maryland, and the U.S. National Arboretum at Washington, D.C. Many of these were raised from seeds or plants collected in Japan, Korea of Taiwan.

(b) Library

Forty four titles have been added during the past twelve months; this compares with 68 in 1969-70 and 33 in the previous year. Amongst our latest acquisitions have been *Theatrum Botanicum, A Herball of Large Extent*, by John Parkinson, (London, 1640), purchased through the Arboretum Foundation book fund of September 1969; *Flores Silvestres de Chile*, by C. M. Pizarro, (University of Chile, Santiago, 1966); *The Silviculture of Indian Trees*, by R. S. Troup, 3 vols., (Oxford, 1921), and *Icones Plantarum Sinicarum*, by H.-H. Hu and W.-Y. Chen, fasc. 1-5, (reprint, Tokyo, 1970), with 250 drawings of Chinese plants. These last three were purchased with funds given in memory of the late Dr. Henry Schmitz. Also acquired as a memorial was *The Glory of the Tree*, by Dr. B. K. Boom and H. Kleijn, (Doubleday & Co., New York, 1966), given by the Mercer Island Garden Club in memory of Mrs. H. Tate. Two more notable volumes added were; vol. 4 of *Wild Flowers of the United States; the Southwestern States*, edited by Dr. H. W. Rickett, published by McGraw-Hill Co., (New York, 1970); this, like

(continued on p. 22)

Typical myrtlewood growth patterns: left, growing in open countryside; right, growing in a private garden.

THE OREGON MYRTLE,
Umbellularia californica

*JOHN H. BERGEN**

The Oregon Myrtle tree is "one of the stateliest and most beautiful inhabitants of the North American forests, and no evergreen tree of temperate regions surpasses it in the beauty of its dark dense crown of lustrous foliage and in the massiveness of habit which makes it one of the most striking features of the landscape and fit it to stand in any park or garden." This quotation by Sargent from Bailey's *ENCYCLOPEDIA OF HORTICULTURE* beautifully describes the Oregon Myrtle tree.

Oregon Myrtle or California Laurel is known botanically as *Umbellularia californica* and is the only species of the genus. It can be readily distinguished from other broad leaved evergreens in its natural growing range by the camphoric-pungent odor of its crushed leaves. Some uninformed people have claimed that it naturally grew only in Southwest Oregon and the Holy Land. Actually, it does not grow in the Holy Land and its natural range extends from the Umpqua River in Southwestern Oregon to as far south as the California-Mexican border. In its northern growing area, it may be found from sea level to 1500 feet elevation and farther south from 2000 to 4000 feet. It is commonly found growing in moist places, particularly along streams or where the long tap roots can reach down to water. It is most generally found along the coast range and seldom in the drier interior valleys.

Growing among other trees it may be tall to 60 to 80 feet with a trunk three to four feet in diameter. In more open country it develops a large compact round head. In higher elevations and moist shaded mountain canyons, it grows as a many stemmed shrubby form in clumps and thickets.

The wood of the Myrtle tree is moderately heavy, hard and fine-grained with a yellowish-brown color that is often beautifully mottled. It is extensively used commercially for carved and turned wooden bowls, trays, animal figures and other artistic carvings.

As a landscape subject it has many ornamental uses. As a specimen tree, it develops a large, round, compact, broad-leaved evergreen head. I have kept it trimmed to a hedge as low as two to three feet for over 20 years and also allowed it to develop into a windbreak sheared to four to five feet wide and 25 to 30 feet high in twenty years. I have seen a myrtle tree with a trunk three feet in diameter, cut back to a bare stump three feet above the ground, sprout out from adventitious buds to form a ball shaped mass of growth in two years time.

The foliage and bark contains an aromatic volatile oil with a pungent odor. Branches and leaves thrown on a campfire crackle and flare up permeating the air with a delightful scent and crackling sound. Gourmet chefs delight in using the dried leaf for seasonings in soups and stews in much the same manner as leaves of the bay or *Laurus nobilis*.

New plants may be started from rooted cuttings, but it is easier to propagate from the nut-like fruits. The seed is of comparatively short vitality, but germinates readily if freshly gathered in the fall. Young seedlings transplant readily; but larger, older plants may be difficult to move unless grown in containers.

Its rate of growth may be considered slow as compared with many other trees — usually about a foot a year. Myrtle trees are quite tolerant of varying light condition. They will grow in shade or full sun and have little trouble with disease or insect problems.

When one considers the beauty of habit and foliage, the absence of disease and insect problems and its suitability to our coastal Northwest climatic conditions, the Oregon Myrtle, *Umbellularia californica* deserved to be more widely planted. ▲

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*Mr. Bergen, a Foundation member, a graduate in Botany from Oregon State University, is a nurseryman — florist in Coos Bay, Oregon.

Groupings of myrtlewood trees growing in LaVerne Park on the North Fork of the Coquille River in Southwestern Oregon. This park, now 300 acres, was originally established in 1923 by the United States Congress and the Department of Interior to preserve the natural myrtlewood grove. Here groups of trees 50 to 75 or more feet high have grown together to form an evergreen canopy overhead with moss-encrusted trunks of great beauty. Photos by: J.P. Butler

The Arboretum Answers

J. A. WITT

These questions are representative of those asked the Arboretum staff from time to time throughout the year.

Q. What is wrong with the madronas around here? They all seem to be dying.

A. I hope you are wrong about *all* but I agree that there are a large number which are showing some real problems. There are several causes for this, not just one, but according to Dr. Davison, pathologist at the Western Washington Research and Extension Center in Puyallup a major cause is a fungus that causes cankers on the branches and trunk. There are also several leaf-spot diseases and at least one insect pest, a leaf miner, which cause browning and discoloration of the foliage. The Cooperative Extension Service of Washington State University has a publication on madrona diseases, E.M. 2951, "Leaf Spots and Limb Dieback on Madrona", which gives symptoms and suggests control measures. The Arboretum office has a limited number of this which we can give out, but it should be available at the County Extension Service office.

Q. (This question was called in in July.) My family wanted to drive through the Arboretum last weekend and we found the roads blocked. What is the idea anyway? We thought you were open to the public every day of the year.

A. We are always open but we do not have control of the roads that go through the Arboretum and it was these that were closed to automobile traffic by officials of the city of Seattle. They decided to exclude all cars from the Arboretum on an experimental basis for several weekends during the late spring and summer. Unfortunately, there was a lack of communication between them and the staff here at first, so for several weekends there was considerable confusion about parking, what was open, etc. These problems are now resolved, we hope, and parking will be allowed near the Japanese Garden and in the office area whenever the roads are closed again.

Q. Are the big nuts from the cones of the monkey puzzle tree good to eat? My neighbors' lawn is just covered with them and I hate to see them go to waste.

A. Yes, they are, or were, an important item in the diet of the Araucanian Indians of southern Chile and Argentina. I don't know how they are prepared but I would suggest roasting them as one would chestnuts.

Q. There is a large maple growing in my garden that I think needs fertilizing. How do I go about this since it is surrounded by turf?

A. There are several techniques of doing this and they all depend on getting the fertilizer below the roots of the grass. Probably the easiest way is to poke holes through the turf, into the root zone of the tree, and pour the fertilizer into them. We suggest the holes be up to 18 inches deep and in a circular band starting about 2 feet away from the trunk to a foot or so beyond the edge of the crown of the tree. How much fertilizer do you use? This is a point of some controversy among tree experts, but a safe amount is about 3 pounds of a fertilizer with the approximate analysis of 10-6-6 for each inch of trunk diameter 4½ ft. above the ground. We suggest you mix the fertilizer with peat moss, vermiculite, coarse sand or some such filler to keep the holes open.

There are commercial products that inject aqueous solutions of nutrients into the root zones and other similar techniques available. One can also foliar feed by spraying fertili-

zers on the leaves, but this is feasible only with smaller trees.

Q. *Several years ago we planted a row of Lawson cypress to screen us from a road. These trees have gradually been turning brown and dying. What can I spray on them to keep this from happening?*

A. I seriously doubt if there is any spray that would do your trees much good. Most probably they are infected with a root-rot called *Phytophtora* which is quite common on Lawson cypress, especially if the soil is heavy or wet. You might do well to replace them with another species of evergreen. We have found that *Cupressocyparis leylandii* looks much like Lawson cypress, but as of now, at least, is more resistant to this fungus and could give you the same screening effect.

Q. *(This is most often received in mid-October) My western red cedar is sick. All the inside of the tree is turning brown and falling. What can I do to save it?*

A. This is a very common situation with our native cedar and is really nothing to worry about. Every so often, probably due to some climatic condition we don't quite recognize, these trees shed their interior twigs. The same thing exactly happens to redwood and big tree, but the browning usually shows earlier in the fall. Unless there is another problem I don't recognize your cedar is not sick but merely shedding its old clothes.

HONORS

Edward Dunn, past President of the Arboretum Foundation and a dedicated supporter of our Arboretum, recently received the highest honor given by the American Rhododendron Society — the Gold Medal Award. Presented to Mr. Dunn at the annual meeting of the Society in May, 1971 in Philadelphia, the citation accompanying the award reads in part:

> The qualities of true leadership are found in few men, but the American Rhododendron Society is fortunate to have been served by a man who has these qualities in abundance. A wise counselor, thoughtful chairman, and above all, a gentleman, Edward Dunn has contributed generously to virtually every activity of the Society. A charter member and one of the first presidents of the Seattle Chapter, he has continued to contribute in a major way to the success of Chapter activities while traveling widely on behalf of the Society. Most recently he has been active in the planning stages and instrumental in the acquisition of land for a major Rhododendron Test Garden in the Seattle Area.
>
> A long standing director of the American Rhododendron Society, he has served the National Society with distinction. As Vice-President and President his accomplishments over the years have been meaningful and lasting. None has been more significant, however, than his efforts in strengthening the ties that make the Society a truly National organization. It is a mark of genuine dedication that, after retiring as President, rather than taking a well-deserved rest, he directed his talents to a new challenge and accepted the presidency of the Rhododendron Species Foundation.

We salute and congratulate Mr. Dunn for a most deserved recognition!

Congratulations are also in order to Joseph A. Witt, our genial and always helpful Associate Director of the Arboretum! His many friends will be pleased to know that he was elected President of the American Association of Botanic Gardens and Arboretums in September, 1971 at Oakbrook, Illinois. Mr. Witt is also presently serving as a Director of the Western Chapter of the International Shade Tree Conference.

ARBORETUM CLASSES

The College of Forest Resources administers the education program of the University of Washington Arboretum. For further information, call 543-2730. To register, send check (made payable to the University of Washington) to:

Arboretum Courses
Anderson Hall
University of Washington
Seattle, Washington 98105

WINTER PROPAGATION Mr. Richard van Klaveren, Arboretum propagator, will teach techniques for propagating woody plants, including cutting and seeding. Arboretum greenhouse; class limited to 10. Saturdays, Jan. 15 and 29; 9:30-12:30. 2 sessions, $10.

GRAFTING ORNAMENTALS Mr. van Klaveren will instruct in techniques for grafting woody plants. Materials will be furnished. Arboretum greenhouse; each section limited to 10. 2 sessions, $12.

Section A: Saturdays, Feb. 12 & 26; 9:30–12:30
Section B: Saturdays, March 4 & 18; 9:30–12:30

PRUNING ORNAMENTALS Mr. Chico Narro, expert nurseryman, will lead a field demonstration of pruning techniques for trees and shrubs. Arboretum greenhouse; class limited to 30. Saturdays, March 11 and 25; 10-12 noon. 2 sessions, $5.

GARDEN NUTRITION Dr. Stanley P. Gessel, Professor of Soils, will teach this lecture-discussion class. Material covered will include soil types, composts, mulches and fertilizers. 201 Winkenwerder, UW campus; class limited to 30. Tuesdays, Feb. 8, 15, 22; 7-9 p.m. 3 sessions, $10.

What's *THAT FLOWER THING IN SPRING*
When flowers bloom and robins sing?

This is your Arboretum, kept alive by your support

We are pleased to welcome the following new members (June 1, 1971 through September 30, 1971): *Sustaining* — Mrs. William Gill, Mrs. Philip J. Rasic, Mrs. William T. Russell. *Annual* — Mrs. Don Allenbaugh, Mr. and Mrs. Arthur D. Ayrault, Mrs. T. R. Bale, Mrs. David Beachler, Mrs. Frederick W. Bender, Mr. and Mrs. Patrick G. Benston, Mrs. Tom Beasley, Mrs. W. T. Browning, Mrs. Stanley H. Christensen, Tom Clark, Dr. Jean Cohn, Mrs. Wesley S. de Pierris, Mrs. Walter Ewing, Harold A. Friese, Mrs. George Gibbs, Mr. and Mrs. Peter Goll, James Gossler, Mr. and Mrs. Nicholas C. Healy, Mrs. Leroy Heinrichs, Mrs. William A. Higgins, Mrs. Robert Igo, Grant Jones & Associates, Mrs. Edwin A. Jurgens, Mrs. William C. Kyle, Mrs. Clayton E. Linse, Mr. and Mrs. K. M. MacDonald, Robert P. Matthews, Mrs. Gordon P. Mulder, Mrs. Roy W. Nelson, Mrs. William J. Nims, Mrs. Paul Pedersen, Mrs. F. K. Remington, Mrs. Arnold Robbins, R. Tyrrell Rockafellar, Mrs. Lee Roselli, Mrs. Robert Sarff, Mrs. F. Earl Sells, Mrs. David S. Sumner, Mrs. V. J. Szmkowski, Mrs. Robert L. Tyrrell, Mrs. James D. Weaver, Mrs. Carson M. Wheeler, Mrs. Warland Wight.

We are also grateful to the following members who have increased their dues to: *Contributing* — Mrs. Stuart Frazier, Mr. and Mrs. Alan C. Swartzman.

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UNIT CONVERSATIONS

The Unit Council of the Arboretum Foundation has this September contributed $5,006.00 toward the support of the Arboretum. The donation was given in response to the Arboretum's pressing need for financial assistance resulting from the recent reduction in its legislatively appropriated funds. The money has been sent to the University of Washington for allocation to the Arboretum to assist with costs of worker's salaries, seed and plant distribution to other institutions, and maintenance of the grounds through December.

A series of volunteer weeding parties in the Arboretum have been instigated this fall by the Unit Council of the Arboretum Foundation. Learning of the Arboretum's pressing need for upkeep help due to serious legislative budget cuts, concerned Puget Sounders in the nearly 80 Foundation Units decided to take positive action. Units wishing to work contact the Arboretum Office through Mrs. Frank E. Blake, Jr., project chairman. Unit members, armed with their own garden tools and weed boxes, are then directed to specific work areas by Arboretum personnel. Arboretum Assistant Director Joseph A. Witt says that the weeding done by these generous helping hands has been greatly appreciated by the reduced Arboretum staff. More work parties are planned for the spring season.

The Arboretum Explorers meet at 10:00 AM on the fourth Wednesday of each month at the Foundation office on the Arboretum Grounds for a guided tour through various sections of the Arboretum. There are no reservations requirements and no fees. Tours commence regardless of the whims of Seattle's precipitous climate! They are fascinating and informative and are open to both Foundation members and the public.

Unit Council Greenhouse workers find themselves with a superabundance of member-grown plants in the Foundation's Patricia Calvert Greenhouse on the Arboretum grounds, and will sell plants to all comers any Tuesday morning beginning this fall. Also, eager workers from the Units for the Greenhouse are needed; no experience necessary — will train!

Interesting Books about Strange and Interesting Trees

DER BAUM Bayerische Landwirtschaftsverlag, Munich, 1967.
Brosse, Jacques.

Enjoy in this book the superb illustrations, superbly selected, even if you don't read German. The author has chosen art forms from all time to indicate the inseparability of the tree from art and man. Some of the pictures: a stone relief of a botanical garden from Karnak; two Assyrian winged Gods kneeling before a sacred tree; a tree decoration from an African hut; a tree from a Persian miniature; a memorial placque from the Sforza Castle in Italy, designed by Leonardo da Vinci, and so on through all time. The author's theme is to save trees for mankind while there is still room and time.

EVERGREEN ORCHARDS. 2d ed. rev. Lea & Febiger, Philadelphia, 1958.
Chandler, William H.

"I should like to rise and go
Where the golden apples grow . . ." RLS

Even if your trees only grow applies, peaches or pears, it's still fun to know the vagaries of bananas, avocadoes, olives, mangoes, oranges and lemons (remember in London, the bells of St. Clements say oranges and lemons) The book, a real "five-foot shelf" of facts, describes special characteristics of tropical and subtropical species grown for fruit, and discusses the problems of culture. The Bibliography appended (p. 490-525) has 1,182 references cited. There is an index and 84 illustrations in the text — disappointingly enough not in color.

HAWAII BLOSSOMS. Hargreaves Industrial, P.O. Box 4095, Portland, Oregon.
Hargreaves, Dorothy and Bob Hargreaves.

Colored photographs of Hawaii's flowers and flowering trees, in alphabetical order, with the flowers first in the book. Hawaii's Polynesian first settlers are said to have brought to the Islands 24 of the most useful plants and trees in their big outsize outrigger sailing canoes. Among these are: Cocoanut, breadfruit, banana, bamboo, kukui (for oil – from the candlenuts), hau (for outriggers), milo tree (wooden poi bowls), paper mulberry (tapa cloth), taro, sweet potatoes, ti plant, sugar cane, wild ginger and bottle gourds. (BUY this one – it is only $2 and it's lovely), suitable for both Malihinis and Kamaainas!

SHADE TREE EVALUATION. Dep't. of Horticulture, Ohio State University, Columbus, Ohio, 1965. (Published by Collier Printing Company, Wooster, Ohio)
International Shade Tree Conference.

Size, kind and condition are the basic factors in determining dollar value of shade and ornamental trees. The Shade Tree Evaluation Committee here sets forth the method of evaluating trees, based on a fixed value of $6.00 per square inch (adopted as the standard by the International Shade Tree Conference as a conservative value of a perfect specimen shade tree). Tables with examples are given, showing how you can tell if you have a million dollar tree (or thereabouts!) The highest value goes to single specimen trees, but park trees in groups can be evaluated using a percentage factor to give a realistic figure.

FANTASTIC TREES. Viking Press, New York, 1967.
Menninger, Edwin A.

Practice in believing impossible things as suggested to Alice by the Queen in *Alice in Wonderland* (her record: believing six impossible things before breakfast) is needed in reading this book of strange facts about strange trees. Narrative is pleasingly combined with photographs in this botanical expose of exotic tree habits.

MAGIC OF TREES AND STONES; SECRETS OF JAPANESE GARDENING. Japan Publications Trading Co., New York, 1964.
Saito, Katsuo and Sadaji Wada.

The philosophy of Japanese garden composition is revealed in this book. To achieve the ideal in garden display, subtle veiling of nature, with refinement and selectivity, rather than the naked blaze of floral beauty, is recommended. Trees and rock forms and waterless pebble streams and materials most suitable for heightening enjoyment, creating composure, and inducing reflection in the beholder. Exact directions with pictured examples are given for achieving this splendor without ostentation.

TREES IN A WINTER LANDSCAPE; A GUIDE TO TREE IDENTIFICATION AND PLANTING DESIGN. Holt, Rinehart, and Winston, New York, 1969.
Smith, Alice Upham.

To insure having year-'round distinction in your garden, realize with Alice Smith that tree skeletons can be as striking and beautiful as trees in leaf and/or bloom. The structural habits and possibilities of various trees are sketched in black and white, with a view to enabling the reader-looker to choose a suitable silhouette and insure the predetermined purpose of a planting.

DWARF CONIFERS, A COMPLETE GUIDE. C. T. Branford Company, Newton, Mass., 1966.
Welch, H. J.

Especially good for rock gardeners, but fascinating for all Northwest gardeners where conifers are kings, and gardens with similarities to the authors "Pygmy Pinetum" flourish and are a joy practically forever. Particularly good on unravelling and clarifying the puzzling nomenclature of conifers.

TREES FOR ARCHITECTURE AND LANDSCAPE. Reinhold Book Corporation, New York, 1968.
Zion, Robert L.

A collection of tree portraits designed to show trees with structure, habit or particular characteristics which make them important in

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Annual Report

(continued from p. 12)

its predecessors, was a generous gift from the Isaacson Corp. of Seattle. The other is the first volume (of the planned four) of the revised 8th edition of *Trees and Shrubs Hardy in the British Isles*, originally written by W. J. Bean, now edited by Sir G. Taylor, (Murray, London), 1970). This is a most valuable and authoritative work for the Puget Sound region since it contains descriptions and illustrations of many unusual plants not found in other references.

(c) Gifts and Donations

Among many during this period the following must be mentioned:

From the Arboretum Foundation:

guards in the Japanese Garden	$1,500.00
pruning in the Japanese Garden	750.00
stepping stones in the Japanese Garden	200.00
Rhododendron Glen	245.00
memorial books, for Dr. H. Schmitz	203.00
(total for four projects,	$2,898.50)

From the Unit Council of the Foundation

maintenance, 1970-1971	2,500.00
a new truckster (3-wheeled)	1,500.00
the travel fund	1,500.00
research on air pollution	1,500.00
truck rental, spring 1971	500.00
(total for five projects,	$7,500.00)

Arboretum Unit donations

The following Units donated $100.00 or more:

Units 22, 25, 33, 39 (twice), 40, 41 (twice), 45, 47.

#25 gave $300.00 in May towards the purchase of a chipping machine, besides their valuable contribution in packeting and sending out our annual seed exchange with other institutions; #41 contributed $100.00 to the travel fund in September 1970 and in April this year gave us $250.00 for a new chain saw and $100.00 for the library. #39 gave $100.00 for maintenance in October and the same amount again in March.

The total amount received in fifty small donations (from $5.00 upwards) from other Arboretum Units, garden clubs and private individuals during the year was $880.80. We are also much indebted to those Unit members who contributed their time and efforts for the benefit of the Arboretum on Work-and-Fun Day, the annual plant sale, and working in various places on different occasions, including the rock garden, Japanese Garden and Woodland Garden, and in binding slides for the continuing collection made by Mr. Witt.

Some other large donations include: —

From the Friends of the Arboretum,

for a garden of native plants adjacent to the proposed new office building	$12,242.00
for a new Arboretum publication	4,800.00
Education Fund	1,000.00
Travel Fund	1,000.00
(Total for four purposes	$19,042.00)

From the O.D. Fisher Foundation

for new sprinkling systems in Arboretum	$ 8,427.00

Other miscellaneous donations

Seattle Garden Club, for Azalea Way	2,993.00
West Seattle Garden Club, for Woodland Garden	200.00
Mercer Island Garden Club, for Winter Garden	150.00
Mrs. Walter Wyckoff, without restriction	200.00

4. Educational Activities

These are many and various, and include group tours, lectures or informal talks, demonstrations of propagation and pruning, special exhibits set up for plant society shows or conferences, the production of information leaflets, the lending of sets of Kodachrome slides or supplying plant material for talks by garden club members and for the Pacific Science Center, telephone inquiries answered, occasional advisory visits, and so on.

During 1970-71 31 tours were conducted, chiefly by Mr. R. Van Denburgh but some by Mr. Witt. Nineteen talks or lectures, generally illustrated by our own slides were given by Mr. Witt and others. Six demonstrations of propagation and six of pruning woody plants were given by Mr. R. van Klaveren and Mr. E. Narro respectively, one series during November and December, the other in February and March.

These are well attended and appreciated. Collections of slides were loaned to garden clubs or Arboretum Unit members on 48 occasions during both 1969 and 1970, while during the first six months of this year 46 lots of plant specimens were supplied. In January and February Mr. Witt presented a series of seven lectures on *The Cultivated Conifers*, and in April and May conducted six tours of certain areas of the Arboretum, entitled *The Arboretum in Depth*. Both of these were fully attended by approximately 30 persons.

A collection of fruits of various kinds was displayed at the Washington State University Experiment Station, Mt. Vernon, Wash., Oct. 17, at a meeting of the Northwest Fruit Explorers.

A small exhibit of various rhododendrons and azaleas was arranged at the Seattle Rhododendron Society's annual show in Bellevue, May 14-16 and on the occasion of the College of Forest Resources Open House at Bloedel Hall April 1-4, a collection of various plants in containers, chiefly conifers of different genera, was set up for the interest of visitors.

New information brochures on the Arboretum in Summer, and Fall and Winter, were produced for our visitors last year, followed this spring by a third covering that season.

The following classes from University Colleges and Departments have utilized Arboretum facilities and materials. In the Fall quarter, Forest Resources 204 (now 300), under Prof. R. F. Stettler; in the Spring quarter, Botany 331, Ornamental Plants, under Prof. C. L. Hitchcock, on three afternoons each week, as with the former class. The Department of Zoology (Prof. K. L. Osterud) collects material regularly each quarter for Biology 100, approximately once a week during Spring quarter, and also brings the class to the Arboretum at the end of that quarter. Students in Landscape Architecture under Prof. E. D. James also visit it regularly each quarter. In January Prof. Creso from the Botany Department of Pacific Lutheran University, Tacoma, brought her class here. A group of students from the Department of Horticulture, Washington State University, under Prof. K. Schekel, visited us on April 5, during spring vacation. On December 1 Mr. Jim Ely brought his Horticultural Vocational trades class from Clover Park, Tacoma, to study various facets of the Arboretum, including organization, the plant collections and their propagation. Many local elementary schools make frequent use of the Arboretum facilities by means of buses, especially from Bellevue, Shoreline, Lake Washington and Edmonds, often combining such a visit with one to the adjacent Museum of History and Industry.

The number of telephone inquiries for horticultural information of all kinds but most frequently concerning pests or diseases of plants, has exceeded 3,000 annually in four out of the last five years, and for the first six months of 1971 has been averaging 15-17 calls every working day. If each call occupies three minutes then about 20 hours every month is taken up in performing this useful service to the local communities. If this rate is continued we shall probably exceed 3,500 calls in 1971.

5. Plants and Seeds Distributed

During these twelve months 52 consignments of plant material were sent out, of which 25 went to other similar institutions in the U.S., one to Vancouver, B.C., one to Wageningen, Holland, the remainder to nurseries in Washington or Oregon or to other persons with whom we exchange material. Our new hybrid *Ceanothus* 'Montlake' has been distributed to several places for trial, including the Santa Barbara Botanic Garden, California. In April 159 surplus trees and shrubs from our nursery were donated to assist in landscaping the campus of the new North Seattle Community College.

Our annual seed exchange list contained 221 items, of which 16 were collected in the wild state, chiefly in Washington. A total of 2,850 packets have been made up and sent to 182 other institutions or correspondents, compared with 3,244 and 214 respectively in 1970. The most popular items were *Daphne retusa*, our native western dogwood (*Cornus Nuttallii*), *Nyssa sylvatica*, the black gum or tupelo, and *Magnolia Wilsonii*, for each of which we received from 32 to 42 requests. Unit #25 has again been responsible for all the work connected with this operation, an invaluable assistance to us.

6. Research Material Requested

In September we received a visit from Prof. Stefan Bialobok, Director of the Arboretum of the Academy of Sciences at Kornik, Poland, which I had seen during my European tour in May-June, 1967. Subsequently Prof. Bialobok requested for genetical studies cuttings of our native western cottonwood (*Populus trichocarpa*) from a number of different sources in Washington; these we were able to obtain through the kind assistance of the U. S. Forest Service in this state and ship to Kornik by air in March.

At the same time we sent cuttings of another native plant, *Salix Scouleriana*, to the Institute of Forest Botany at Brno, Czechoslovakia, which possesses one of the largest collections of willows in Europe and with which we have previously exchanged material.

Other items to be included under this heading were roots of two Japanese species of *Lindera*, sent to the Institute of Pharmacognosy at the Free University of Berlin; pollen of rhododendron species to the Norfolk Gotanic Garden, Norfolk, Va.; preserved material of *Metasequoia* to the University of N. Dakota at Grand Forks, and flowers and dried herbarium material of a number of Asiatic maple species to the Belmonte Arboretum, Wageningen, Holland.

7. Arboretum Plant Records

These have recently been recorded on microfilm by Mr. R. Brown of the Plant Records Center at Lima, Pa., for the American Horticultural Society, funded by a series of grants from the Longwood Foundation. They will be transferred to cards in an electronic data system and then be available to other cooperating institutions as well as ourselves for any future use. The Center will supply us with two complete lists of our collection without charge. The total number of our record cards photographed was 6,407, but the actual number of taxa concerned (species, varieties and other forms) was 4,967. Out of the latter total 1,286 or almost 26%, were rhododendrons. We now know the total extent of our collections, which previously had only been estimated. Our card files of color slides and black and white photographs were also microfilmed at the same time. The typing of the catalogue is now almost completed, so that soon we should be in a position to publish a printed list in some form.

8. Meetings attended by staff members

The Director attended the Conifer Conference organized by the Royal Horticultural Society and held in London October 5-10 and in Edinburgh, October 11-16, 1970. This included lectures, at one of which I acted as Chairman, a most extensive exhibition of conifers in the R.H.S. Hall, London, and visits to notable arboreta, public and private gardens in the two regions.

This tour was also extended to include visits to seven arboreta or botanical gardens in France, Belgium and Holland prior to the meeting, and the thirteen other private gardens or institutions in Ireland and England following the Conference. The results of this tour will be seen in the seeds and plant material which I was able to collect en route. I am much indebted to both the Arboretum Foundation Unit Council and the Friends of the Arboretum for travel funds which made these visits possible.

Mr. Witt, Assistant Director, attended the joint annual meeting of the American Horticultural Society and the American Association of Botanical Gardens and Arboreta in Miami, Fla., November 1-5, being Vice-President of the latter body. He also took part in a symposium on a selected number of arboreta and botanical gardens of the U.S. On February 19 Mr. Witt and Mr. Narro, nursery foreman, attended the Northwest Regional meeting of the International Shade Tree Conference at Portland, Oregon.

10. Staff

In September Fermin Navejar replaced Wilbur Knox, Jr. as groundsman and occupied the stone cottage near Madison Street. However, he left us June 30 for work in Oregon. Three men were temporarily employed as groundsmen at different periods from July to December 1970, using funds donated for maintenance by the Unit Council, Seattle Garden Club and others. The total amount involved was $3,731.88. This year we have had one extra man on similar funding since April 19.

The amount and quality of the work accomplished by our skilled and dedicated

crews in all departments of the Arboretum is certainly notable. Without their continuing efforts the Arboretum would soon deteriorate and lose the obvious attraction which is now has for our numerous visitors. ↑

Facts and Figures of the Arboretum

	1970	1969	1968
Vehicle count at office	170,300	149,700	156,100
Japanese Garden visitors	71,165*	35,950	36,822
Telephone inquiries	3,242	3,129	2,615

*Turnstile count

Arboretum staff, 1971.
(L. to R.) back row: R. W. Van Denburgh, J. A. Witt, M. Marketto, W. Jue.
middle row: A. V. Houle, R. B. Hart, L. Oberhofer, J. Pluschke, R. Okinczyc, K. Silvernail
front row: E. Narro, R. Stevick, D. van Klaveren
Secretary, Mrs. B. Wittenberg, not included.

Photo by: B. O. Mulligan

Books

(continued from p. 21)

relation to enhancing buildings, and the planned landscape in general. Contains a variety of lists to fit the gardener who wants to emphasize or dramatize a selected or choice area. All lists are organized alphabetically by state in such categories as: trees with interesting bark; trees with colored blossoms; trees with beautiful summer foliage; trees with beautiful fall foliage, etc., etc., etc. ↑

Bernice Ferrier Smith
Forest Resources Librarian
University of Washington

Acknowledgement

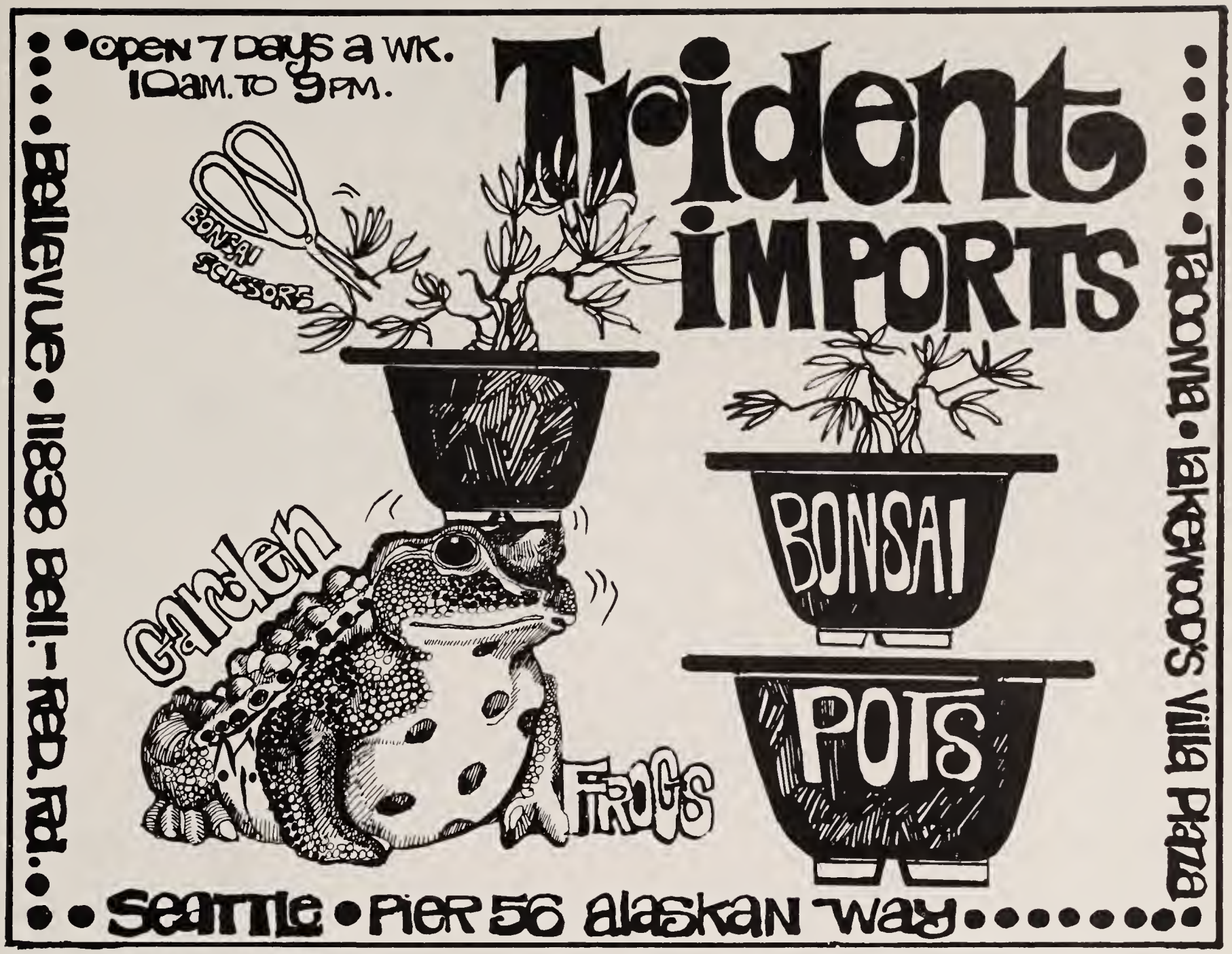
The Editorial Board wishes to acknowledge with gratitude the pictures of the Japanese lanterns appearing in the Summer issue of the BULLETIN as the work of Mrs. George D. Zoll, Unit 55, the Sally Bunge Unit.

ARBORETUM WEATHER

July 1, 1970 - June 30, 1971

	TEMPERATURE				PRECIPITATION		SUNSHINE	
1970	Max.	Min.	Ave.	(Normal)		(Normal)	% Sun	(Normal for last 5 years)
July	87°F.	47°F.	65.2	64.2	0.79″	(0.72″)	61	(67)
Aug.	88	46	63.4	63.7	0.78″	(1.23″)	55	(64)
Sept.	84	36	58.7	59.4	2.24″	(1.96″)	51	(56)
Oct.	75	26	49.7	51.8	3.42″	(3.57″)	37	(39)
Nov.	72	23	44.6	44.5	5.03″	(6.11″)	28	(29)
Dec.	50	22	38.3	40.5	7.87″	(6.18″)	18	(19)
1971								
Jan.	56	21	38.8	38.2	5.26″	(6.55″)	Not Available	
Feb.	56	24	40.0	42.1	4.11″	(4.20″)	36	(45)
Mar.	61	18	41.7	43.8	7.25″	(3.75″)	39	(47)
Apr.	78	32	48.8	48.2	2.54″	(2.63″)	54	(51)
May	88	38	55.7	54.9	1.79″	(1.87″)	43	(58)
June	84	41	56.8	59.9	2.24″	(1.56″)	31	(55)

June, July and August in 1970 were all warm and sunny, with very low rainfall. In June we received 300 hours of sunshine, in July 295 hours, and in August 244 hours (total 839 hours); the rainfall only averaged .78 ins. each month. It is probable that this type of weather had much to do with the profuse flowering we have enjoyed on many plants this spring and early summer — cherries, magnolias, crab apples and rhododendrons for example. Rainfall for the last three months of the year (15.92 ins.) was about average and we finished with a total of 38.95 ins. Frosts were recorded on five days at the end of October, to the benefit of our fall color display, then again in late November and through much of December. Cool weather continued through January and February but fortunately was not cold enough nor sufficiently prolonged to do any serious damage to our plants, except the most tender kinds planted around the offices and greenhouses and to the flower buds of the early *Magnolia*. The buds of *M. Sargentiana* 'Robusta' and *M. Campbellii* were nearly all blasted, and what promised to be a great display on these fine species ended up in blackened and twisted flowers. The lowest temperatures recorded were 21°F. on January 5, 23°F. on January 3 and November 22, and 24°F. on February 28 and 18°F. on March 1. During the first six days of January the temperature did not rise above 36°F. and on the 11th, 12th and 13th it was only 34°F. maximum. March was exceptionally wet with 7.25 ins. of rain, which created problems of various kinds. The spring generally has been cooler and wetter than usual and our plants have consequently lasted longer in bloom.



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THE ARBORETUM FOUNDATION
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Seattle, Washington 98105

THE ARBORETUM FOUNDATION
STATEMENT OF CASH RECEIPTS AND DISBURSEMENTS BY FUNDS
YEAR ENDED APRIL 30, 1971*

	Consolidated
RECEIPTS:	
Dues	$ 21,590.00
Donations	25,629.75
Unit Council	
Plant Sales	34,863.10
Other	3,765.44
Interest on savings accounts	2,535.06
Net income from Investment Trust	801.39
Advertising and miscellaneous	436.60
Discount earned on matured short-term investments	8,715.67
TOTAL RECEIPTS	$ 98,337.01
DISBURSEMENTS:	
Salaries and Christmas bonus	$ 11,180.16
Payroll taxes	629.67
Membership expense	2,404.65
Bulletin publication	6,746.72
Publicity and educational program	1,159.93
Telephone	326.28
Professional services	800.00
Capital equipment	1,464.75
Other operating expenses	2,133.67
Unit Council expenses	
Plant sale costs and expenses	7,955.65
Utilities, supplies, postage and books	2,017.35
Miscellaneous	874.36
Donations to University of Washington Arboretum, including $9,500.00 by Unit Council	24,045.51
TOTAL DISBURSEMENTS	$ 61,738.70
Excess of receipts over disbursements for the year before interfund transfers and purchase of investments	$ 36,598.31
CASH BALANCES, APRIL 30, 1970	97,468.58
Transfers (to) from General Fund	
Maturing of securities held at April 30, 1970	93,105.19
ALLOCATED CASH BALANCE APRIL 30, 1971	$227,172.08
ENDOWMENT TRUST FUND PRINCIPAL	$15,887.71
ALLOCATION OF FUNDS	
General Fund	$ 79,987.92
O. D. Fisher Funds	9,681.85
Endowment Trust Fund Monies	836.40
Floral Hall Fund	99,899.01
Memorial Fund	16,367.91
Japanese Garden Fund	51.01
Educational Program - Library Fund	2,893.71
Tolmie Fund	20,454.18
FUNDS ON HAND APRIL 30, 1971	$227,172.08

*Financial Statement as prepared by Price Waterhouse & Co.

THE ARBORETUM BULLETIN
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University of Washington Arboretum
Seattle, Washington 98105

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